Outyear Plan

Operable Unit No. 7 — Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203)

Final Report

April 15, 1994

EG&G ROCKY FLATS

Rocky Flats Site
Golden, Colorado

Outyear Plan

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2

TABLE OF CONTENTS

LIST OF TABLES

5

LIST OF FIGURES

1. INTRODUCTION

The Rocky Flats site is located at the foot of the Rocky Mountains in northern Jefferson County, Colorado. The site is approximately 16 miles northwest of Denver and is near the suburban communities of Westminster, Broomfield, and Arvada. The Rocky Flats site covers approximately 6,550 acres with approximately 400 acres used for industrial activities.

The past mission of Rocky Flats was the production of components for nuclear weapons. The final products included component parts manufactured from uranium, plutonium, beryllium, stainless steel, and other metals. Production activities included metalworking, fabrication and component assembly, plutonium recovery and purification, and associated quality control functions. Research and development in the fields of chemistry, physics, materials technology, nuclear safety, and mechanical engineering were also conducted.

Operations at the plant began in 1952. In 1989, many of the production functions at the plant were suspended. In January 1992, the decision was made not to resume plutonium production.

Past production operations led to the release of hazardous substances at the site. Currently, these releases are being investigated and remediated. Release of hazardous materials have been grouped into 16 operable units (OUs) to facilitate investigation and remediation. The Present Landfill, Inactive Hazardous Waste Storage Area, and East Landfill Pond and adjacent spray evaporation areas have been designated as OU 7.

1.1 Purpose

This OU 7 Outyear Plan (OYP) describes, schedules, and estimates the cost of investigative and remedial activities at OU 7. Cost estimates in the OYP assume that OU 7-specific funds will be used for all activities. The schedule is based on working days. This document will be used to support the Five-Year Plan (FYP), work packages, and other U.S. Department of Energy (DOE) and EG&G Rocky Flats (EG&G) planning documents. The OYP will be updated as necessary to reflect new technical information; new regulatory requirements; impacts from schedule, cost, and resource constraints; and impacts from other Rocky Flats programs.

1.2 Organization of Report

The organization of the OYP is based on the requirements of the FYP and work packages. Section 1 describes the site, past work, and other potential impacts on OU 7 remediation. Section 2 addresses regulatory issues. Section 3 discusses planning assumptions. Section 4 presents activities by fiscal year. Section 5 presents schedules and milestones. Section 6 presents costs. Schedules were developed in Primavera. Cost estimates were formatted in Excel.

1.3 Background

OU 7 is located north of the plant complex at the western end of No Name Gulch. For the purpose of estimating the costs of remedial actions, OU 7 is divided into the following four areas:

- Present Landfill (Individual Hazardous Substance Site [IHSS] 114)
- Inactive Hazardous Waste Storage Area (IHSS 203)
- East Landfill Pond
- Spray evaporation areas adjacent to the East Landfill Pond

Each of these areas is discussed in detail below.

1.3.1 Present Landfill (IHSS 114)

The Present Landfill (IHSS 114) is an operating landfill that covers an area of approximately 27 acres. Operation of the landfill was initiated in 1968 to provide for disposal of the plant's nonradioactive solid wastes. A portion of the natural drainage was filled with soils from an onsite borrow area to a thickness of up to 5 feet to construct a surface on which to start landfilling. Waste was then delivered to the landfill and spread across the work area. Wastes included paper, rags, floor sweepings, cartons, mixed garbage and rubbish, demolition material, and miscellaneous items.

The waste disposal procedures currently used at the landfill have not significantly changed since the landfill went into operation in 1968 (DOE 1991a). Waste is delivered to the landfill three days a week throughout the morning and early afternoon. In mid-afternoon, waste is spread across the work area. After the waste has been

4

dumped and radiation monitoring has been completed, the waste is compacted and buried with 6 inches of clean fill from onsite stockpiles. A "lift" of waste is completed by the addition of a 3-foot-thick layer of compacted soil.

Five gas vents are present within the operating landfill. These vents are constructed of polyvinyl chloride (PVC) and extend above the ground surface approximately 5 feet. Numerous monitoring wells are also present within the landfill.

In September 1973, tritium was detected in leachate draining from the landfill. In response, a sampling program was undertaken to determine the location of the tritium source, monitoring of waste prior to burial was initiated to prevent further disposal of radioactive material, and interim response measures were developed to control the generation and migration of the landfill leachate.

Interim response measures included construction of two detention ponds immediately east of the landfill, a subsurface intercept system for diverting groundwater around the landfill, a subsurface leachate collection system, and a surface-water diversion system.

The surface-water diversion ditch was designed to divert surface water runoff around the landfill. The West Landfill Pond was designed to impound leachate generated by the landfill. The East Landfill Pond provided a backup system for any overflow from the West Landfill Pond and collected groundwater from the groundwater intercept system. The leachate collection system drained only to the West Landfill Pond; however, intercepted groundwater could be directed to either pond or to the surface drainages downgradient of the East Landfill Pond by a series of valves.

Between 1977 and 1981, portions of the leachate collection and groundwater intercept systems were buried during landfill expansion. The eastward expansion covered the discharge points of the leachate collection system into the West Landfill Pond. The West Landfill Pond was covered in May 1981 during further eastward expansion of the landfill. In 1982, two slurry walls were constructed to prevent groundwater migration into the expanded landfill area. These slurry walls were tied into the north and south arms of the groundwater intercept system.

Although landfill wastes are buried in the leachate collection trench, there is no evidence of solid waste burial outside of the clay barrier or slurry walls. Based on the Phase I Resource Conservation and Recovery Act (RCRA) facility

investigation/remedial investigation (RFI/RI) at OU 7, there is evidence of groundwater flow beneath the northwestern section of the groundwater intercept system. However, the quantity of groundwater flowing into the landfill and the length of the intercept system, which is failing, have not been determined.

The existing leachate collection system is only partially effective. Although the gravel backfill portion of the diversion trench is effective in keeping leachate within the northern, southern, and western limits of the landfill, leachate seeps out along the eastern boundary just above the East Landfill Pond and may impact the groundwater around the pond. Leachate is prevented from migrating downward beneath the landfill by the claystone bedrock.

The existing surface-water diversion ditch appears to be effective in diverting offsite surface waters around the landfill and the East Landfill Pond.

Because records indicate that some hazardous waste was disposed at the landfill, it was designated as an interim status RCRA-regulated unit and included in the RCRA Part B permit application for the Rocky Flats site. The landfill currently accepts only nonhazardous solid waste and therefore will not be permitted as an operating RCRA unit. In 1988, an alternate groundwater monitoring program was implemented at OU 7 in accordance with 6 Colorado Code of Regulations (CCR) 1007-3 and 40 Code of Federal Regulations (CFR) 265.90 (d) for interim status RCRA units. OU 7 will remain under interim status until closure.

1.3.2 Inactive Hazardous Waste Storage Area (IHSS 203)

The Inactive Hazardous Waste Storage Area (IHSS 203) is located at the southwest corner of the Present Landfill. This area was actively used between 1986 and 1987 as a hazardous waste storage area for both drummed liquids and solids. Fifty-five-gallon drums containing liquids were stored in 14 cargo containers. One additional container was used to store spill-control items such as oil sorbent and sorbent pillows.

In 1987, all cargo containers were removed from the storage area, and hazardous materials are no longer stored there.

10

1.3.3 East Landfill Pond

As discussed above, the East Landfill Pond was originally built as part of an interim response measure implemented in 1973 to control overflow from the West Landfill Pond and collect groundwater from the groundwater diversion system. In 1974, an engineered pond embankment was constructed to replace the original temporary embankment. The engineered embankment included a low-permeability clay core keyed into bedrock. The pond covers approximately 2.5 to 2.7 acres.

1.3.4 Spray Evaporation Areas

To prevent the two detention ponds from overfilling and discharging into the drainage, water was periodically sprayed on the ground surface adjacent to the landfill ponds to enhance evaporation. Areas where spray evaporation operations historically occurred were designated as IHSSs 167.1, 167.2, and 167.3 and incorporated into OU 6. After a review of historical records, the locations of IHSSs 167.2 and 167.3 were changed to the areas adjacent to the East Landfill Pond. These IHSSs now fall within the OU 7 boundary.

1.4 Other Rocky Flats Programs and Impacts on OU 7

The current and planned investigation and remedial activities at OU 7 are being conducted by the EG&G Environmental Management Division (EMD) of Rocky Flats. EMD conducts environmental and remedial programs at 16 Rocky Flats OUs and conducts environmental evaluations and monitoring programs sitewide. Many of the sitewide programs interact with the OU investigations. Sitewide surface-water and groundwater monitoring, soil sampling, and ecological monitoring use data produced by OU investigations, and monitoring wells installed as part of OU-specific investigations become part of the sitewide network.

Two OU 6 IHSSs are located within the OU 7 boundaries. These IHSSs have been investigated as part of the Phase I RFI/RI for OU 6. Remedial activities at these OU 6 IHSSs may affect scheduling of remedial activities at OU 7.

2. REGULATORY CONSIDERATIONS

The investigation and remediation of OUs at Rocky Flats are subject to both federal and state regulations. These regulations and their potential impact on the OU 7 remediation are discussed briefly below.

2.1 Interagency Agreement

In order to establish a common basis of understanding and to integrate the requirements of federal regulations with those of the Colorado Department of Health (CDH), an Interagency Agreement (IAG) was negotiated among DOE, the U.S. Environmental Protection Agency (EPA), and CDH and signed on January 22, 1991 (DOE 1991b). The purpose of the IAG is to establish a legally enforceable framework to facilitate coordination of cleanup and oversight efforts and to standardize requirements. The IAG establishes specific milestones and time frames for remedial actions as well as penalties for noncompliance with the agreement.

The IAG framework established the joint EPA, CDH, DOE agreement for designation and administration of RCRA and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) remediation at Rocky Flats. CDH is the lead regulatory agency for sites designated as RCRA units. The designation of OUs as RCRA- or CERCLA-regulated units is based on the effective date of the 1980 RCRA regulations. Sites that were in operation at the time that these regulations went into effect required "interim status permits" to continue operation and therefore became RCRA units. At Rocky Flats, the following are interim status units: Solar Evaporation Ponds, West Spray Field, Present Landfill, Original Process Waste Lines, and various smaller IHSSs grouped into the Other Outside Closures and Inside Building Closures OUs. Sites that were inactive at the time that RCRA regulations went into effect were designated as CERCLA OUs.

In 1988 Rocky Flats prepared the Present Landfill Closure Plan (DOE 1988) for OU 7; however, the activities detailed in the closure plan were superseded by the IAG. The IAG requires that Rocky Flats conduct Phase I and Phase II RFI/RIs at OU 7 to characterize contaminant sources and determine the nature and extent of contamination. Additional requirements include the corrective measures study/feasibility study (CMS/FS) and

treatability studies to support the decision-making process. Rocky Flats is currently streamlining the RFI/RI and CMS/FS process by implementing presumptive remedies.

2.2 State and Federal Regulations

2.2.1 State Regulations

The section of the Code of Federal Regulations governing hazardous waste (40 CFR Section 265.1[c]) states, "The requirements of this part do not apply to . . . a person who treats, stores, or disposes of hazardous waste in a state with a RCRA hazardous waste program authorized under Subpart A or B of Part 271 of this chapter." Colorado is such a state, and therefore, the governing regulations for the Present Landfill are contained in 6 CCR 1007-3 Part 265.

Closure and post-closure requirements applicable to the Present Landfill are specified in Subpart G of 6 CCR 1007-3. Sections 265.11 through 265.115 address closure requirements, while Sections 265.116 through 265.120 address post-closure requirements. In general, a closure plan (and amendments, if necessary) must be submitted and approved as specified in Section 265.112. An approved post-closure plan (and amendments, if applicable) must be implemented following the certification of final closure of the landfill. Requirements for this plan are contained in Section 265.118 and include the requirement that monitoring activities be performed to comply with Subparts F (groundwater monitoring requirements) and N (landfills).

Applicable requirements for groundwater monitoring at the Present Landfill (contained in Subpart F) include preparation of an alternate groundwater monitoring plan (other than the one described in Sections 265.91 and 265.92){265.90(d)} and implementation of the plan (265.93[d][7]). As a result, no specific requirements of Subpart F are specifically applicable to the post-closure monitoring. Subpart N contains design requirements for new landfills, operating requirements for all landfills (design of runon control systems, collection and holding facilities for runon and runoff control system, and control of fugitive dust), and closure and post-closure requirements. The only Subpart N closure and post-closure requirements applicable to the Present Landfill are to (1) cover the landfill and (2) monitor and maintain the landfill (including the cover, benchmarks, and monitoring systems) as specified in approved closure and post-closure plans and amendments.

The Present Landfill Closure Plan prepared in 1988 was never formally approved and was superseded by the requirements of the IAG. Rocky Flats will prepare a decision document that will address presumptive and remedial actions and post-closure monitoring at the Present Landfill. Compliance with the IAG fulfills remediation and closure requirements for OU 7, including the Present Landfill.

2.2.2 Presumptive Remedies

Use of presumptive remedies is a method developed by EPA to streamline site investigation and selection of remedial actions based on historical data from successful remedial actions at similar sites. Source containment is the designated presumptive remedy for CERCLA municipal landfills (EPA 1993a). The containment presumptive remedy consists of the following elements:

- Institutional controls
- Landfill cap
- Landfill gas collection (and treatment if necessary)
- Source area groundwater control to contain plume
- Leachate collection (and treatment if necessary)

The presumptive remedy as outlined above was adopted by DOE, CDH, and EPA and will be applied to the OU 7 Present Landfill and the Inactive Hazardous Waste Storage Area. This streamlined approach, which is consistent with Colorado Hazardous Waste Act (CHWA) closure requirements supported by guidance in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and recent EPA guidance for landfills (EPA 1991, 1993a, 1993b), eliminates the need for initial identification and screening of alternatives during the feasibility study and allows for acceleration of the schedule to implement remedial actions and achieve final closure.

2.2.3 Corrective Action Management Units

Remediation of sediments and soils around the East Landfill Pond could be expedited using the new EPA standards and impending CDH standards for corrective action management units (CAMUs). With the CAMU rule, an area can be designated by the EPA regional administrator or authorized state for managing remediation wastes. This

14

area would not have to be contiguous; it could be a combination of OUs. Any waste generated as part of a facility's corrective action and managed in a CAMU is not subject to RCRA land disposal restrictions. The landfill may be able to operate as part of a CAMU at Rocky Flats, allowing excavated soils and sediments from the East Landfill Pond area that have concentrations of contaminants above risk-based levels to be placed in the landfill before capping.

2.2.4 Land Disposal Restrictions

The land disposal restrictions contained in 40 CFR 268 prohibit the land disposal, without treatment, of restricted wastes. The regulations specify the restricted wastes, acceptable treatment options, characterization, and record-keeping requirements. Restricted wastes include those listed in 40 CFR 261.31 and 261.32; liquid hazardous waste having a pH less than or equal to two; liquid hazardous waste containing polychlorinated biphenyls (PCBs) at concentrations greater than or equal to 50 parts per million (ppm); and liquid hazardous wastes that are primarily water and contain halogenated organic compounds (HOCs) in total concentration greater than or equal to 1,000 milligrams per liter (mg/L) and less than 10,000 mg/L HOCs.

The Federal Facility Compliance Act, which went into effect in 1992, requires DOE facilities to develop plans for the treatment and disposal of low-level mixed (LLM) wastes in accordance with 40 CFR 268. These plans have been developed for Rocky Flats and are currently undergoing review. RCRA regulations, contained in 40 CFR 268, prohibit the land disposal of hazardous and LLM wastes unless the waste has been treated. At this time, soils and sediments from OU 7 are not considered restricted and will be placed in the Present Landfill before capping. Placement of these soils and sediments in the landfill is consistent with the CAMU concept.

3. PLANNING ASSUMPTIONS

This section presents the technical, cost, and schedule assumptions that are used for estimating costs and schedule durations for OU 7 Interim Measure (IM)/Interim Remedial Action (IRA), construction, operations and maintenance, monitoring, and reporting activities.

3.1 Interim Measure/Interim Remedial Action Decision Document and Design

3.1.1 Technical

- The technical memorandum submitted for modifying the Phase I RFI/RI Work Plan will include an evaluation of Phase I data and a description of the nature and extent of contamination. This document will satisfy IAG milestone requirements for the Phase I RFI/RI Report and Phase II RFI/RI Work Plan.

- Submittal of the IAG IM/IRA Decision Document will also satisfy IAG requirements for submittal of the Phase II RFI/RI Report

- Environmental Evaluation activities will support National Environmental Policy Act (NEPA) environmental assessment requirements as well

- Risk assessment activities performed for the Phase I effort will not impact the actions described in this document. Actions for OU 7 will comply with CHWA closure requirements for landfills and be consistent with "Presumptive Remedies" guidance from EPA.

- Applicable or relevant and appropriate requirements (ARARs) will be based current site wide benchmarks

- Feasibility evaluations of alternatives will be conducted for the IM/IRA decision process and not under a separate "feasibility study"

- There will be no actual treatability studies performed at OU 7. Demonstrated technologies are available and acceptable to support the IM/IRA. Treatability studies will be limited to documentation of demonstrated technologies and site characterization evaluation.

3.1.2 Cost

- No support hours for field operations personnel are required for activities at the contractor yard, decontamination facilities, or field sites. All support for these areas will be provided in field operation work packages.
- No material or labor costs for maintenance of buffer zone roads, radios, access control, general cleanup, or radiologic engineering and health and safety support outside the OU is included in this work package
- All project management activities such as training, travel, outyear planning, work package development, administrative support, Central Planning support, and reporting will be covered under the project support work package

3.1.3 Schedule

- Preparation of the statement of work and award of the Master Task Subcontract (MTS) will not impact work
- Document and technical memoranda review times for EPA and CDH will not exceed 15 working days
- Document and technical memoranda review times for DOE-Rocky Flats Office and DOE-Headquarters personnel will be concurrent with EG&G and not exceed 26 working days
- Dispute issues will not impact the schedule. Dispute issues are not anticipated on this project. Issues relating to closure requirements will be negotiated in the Revised Work Plan Modification Technical Memorandum for OU 7.

3.2 Remedial Construction

3.2.1 Technical

- The presumptive remedy is isolation and containment, which includes institutional controls, landfill cap, gas collection, source area groundwater control, and leachate collection

- The CAMU concept will be used for removal of soils or sediments in and around the East Landfill Pond that have concentrations of contaminants above risk-based levels. Soils and sediments will be placed in the Present Landfill prior to landfill closure.

- Stabilize slope north of East Landfill Pond

- Remove pond sediments
  - The East Landfill Pond is not considered "waters of the U.S." under section 404 of the Clean Water Act and consequently, a new wetland will not need to be constructed
  - Empty pond by pumping water to a tank truck
  - Pond water will be treated with the leachate water at the existing OU 1 or OU 2 treatment facilities
  - Treated water and leachate will be piped to holding tanks not funded under this project or released downstream
  - Dewater sediments, air dry
  - Remove approximately 4,000 cubic yards of sediments (based on a sediment thickness of 1 foot and a 2.5-acre area for pond)
  - Sediments will be hauled to landfill and spread across surface

- Remove surface soils in spray evaporation area
  - Hot spot removal
  - Place in landfill

- Construct slurry wall on northwest side of pond

- Leachate collection and treatment system
  - Construct temporary leachate collection system
  - Repair subsurface drains, repair and expand existing trenches
  - Install leachate collection sump at east end of landfill
  - Construction will consist of excavation, fill, installation of slab and walls to house pump station, and installation of storage tank
  - Transport by vacuum truck to OU 1 or OU 2 treatment facility
  - Low flow rate (approximately 1 gallon per minute) of leachate into collection system
  - Treated leachate will be piped to holding tanks not funded under this project

- Multilayer cap
  - Existing wells will be abandoned
  - 25 wells, 5 vents: wells will be overdrilled to remove casing, plugged, filled with bentonite grout, and capped with cement
  - Compaction of landfill material to remove voids

- 27 acres to be compacted
- Will use a vibration roller
- Foundation layer will consist of compacted native soil or clay
- Foundation layer will include additional material to complete final landfill contours
- Gas vent layer
- Geotextile fabric will be installed on both the top and bottom of the gas vent layer
- Gas vent layer will consist of Geotextile filter, polyvinyl chloride (PVC) perforated pipe in drain rock, vacuum blowers, header, and a flare
- Collection pipes around perimeter of cap, 200-foot spacing
- Vent pipes: 4-inch high-density polyethylene (HDPE) - length 5 feet
- Landfill gas will be flared
- Geosynthetic clay liner will consist of 1/4-inch Bentomat®
- Flexible membrane liner will be 30 mil
- Drainage layer will consist of washed sand
- Geotextile filter will be installed
- Soil cover will consist of native soil
- Soil cover will be compacted and graded

- Revegetation will consist of the addition of 2 feet of topsoil, disking, seeding, mulching with grass-hay mixture, crimping the mulch, and tacking the entire area to help prevent seed loss due to wind or water erosion
  - Native grasses and forbs will be used in the seeding mixture
  - Construction quality assurance control tests will be necessary

- Groundwater collection and treatment
  - Four extraction wells south and east of the East Landfill Pond
  - Installation of piping to storage tank and installation of storage tank
  - Collection in storage tanks
  - Transport by vacuum truck to OU 1 or OU 2 treatment facility (ultraviolet peroxide and ion exchange)

3.2.2 Cost

- Funding will be available

- OU 7–specific funding will be used for all activities

- All systems will be commercially available

- No support hours for field operations personnel are required for activities at the contractor yard, decontamination facilities, or field sties. All support for these areas will be provided in field operations work packages.

19

- No material or labor costs for maintenance of buffer zone roads, radios, access control, general clean up, or radiological engineering and health and safety support outside the OU is included in this work package.
- All project management activities such as training, travel, outyear planning, work package development, administrative support, Central Planning support, and reporting will be covered under the project support work package.
- Decontamination costs will be 10 percent of total construction costs
- Health and safety support will be needed for all construction activities
- Separate utilities will be needed for each operating system
- Outside construction contractors will perform remedial activities
- All outside construction contractors will need Rocky Flats training
- Construction quality assurance control tests will be 10 percent of the multilayer cap costs
- Command post will be needed for the duration of all construction activities
- Mobilization and demobilization costs are 10 percent of total construction costs
- Contingency costs will be 20 percent of total construction costs
- Regulatory constraints and requirements will not change

3.2.3 Schedule

- There will be minimal weather delays
- Construction of the groundwater collection and treatment system, and leachate collection system can occur concurrently
- Construction of the multilayer cap will start after the construction of the leachate collection system has been completed
- Treatment systems will not need extensive testing before becoming operational

- Regulatory agency approval of designs, plans, and specifications will be timely
- The NEPA process will not interfere with the IAG remediation process

3.3 Operation and Maintenance

3.3.1 Technical

- Routine facility inspection of all systems and the multilayer cap will be necessary
- Maintenance of multilayer cap (mowing, fertilizing, reseeding, mulching, sprinkling, replacing lost soil, maintaining channels, controlling rodents)
- Maintenance of monitoring equipment (replacing monitoring wells; replacing seals, piping, and caps; repairing or replacing pumps; and other routine maintenance)
- Liquids collected from the groundwater collection system and leachate collection system will be treated at either the OU 1 or OU 2 treatment facilities
- Liquids will be trucked to these sites via a vacuum truck monthly
- Liquids from the groundwater collection and treatment system and the leachate collection and treatment system will be sampled and analyzed monthly
- Treated leachate will be piped to holding tanks not funded under this project or released downstream
- The groundwater collection and treatment system and leachate collection and treatment system will be operational for 10 years
- The gas collection system will be operational for 30 years

3.3.2 Cost

- Funding will be available for 10 years of operation and maintenance for the groundwater collection and treatment system and the leachate collection and treatment system
- Funding will be available for 30 years of operation and maintenance for the gas collection system

- Funding will be available for 30 years for maintenance of the multilayer cap
- OU 7–specific funding will be used for all activities
- No support hours for field operations personnel are required for activities at the contractor yard, decontamination facilities, or field sites. All support for these areas will be provided in field operations work packages.
- No material or labor costs for maintenance of buffer zone roads, radios, access control, general clean up, or radiological engineering and health and safety support outside the OU is included in this work package.
- All project management activities such as training, travel, outyear planning, work package development, administrative support, Central Planning support, and reporting will be covered under the project support work package.

3.3.3 Schedule

- The groundwater collection and treatment system and the leachate collection and treatment system will be operational for 10 years
- The multilayer cap will require maintenance for 30 years
- The gas collection system will be operational for 30 years

3.4 Monitoring

3.4.1 Technical

- Post-closure monitoring
  - Will be able to use existing wells
  - Four wells will be monitored
  - Wells will be monitored quarterly
  - Wells will be monitored for all analytes currently monitored at RCRA units
  - Data management and record keeping will be necessary

3.4.2 Cost

- Funding will be available
- OU 7–specific funding will be used for all activities

- No support hours for field operations personnel are required for activities at the contractor yard, decontamination facilities, or field sites. All support for these areas will be provided in field operations work packages.

- No material or labor costs for maintenance of buffer zone roads, radios, access control, general clean up, or radiological engineering and health and safety support outside the operable unit is included in this work package.

- All project management activities such as training, travel, outyear planning, work package development, administrative support, Central Planning support, and reporting will be covered under the project support work package.

- Monitoring will be performed by an outside contractor

- Monitoring will not be part of sitewide monitoring program

3.4.3 Schedule

- Post-closure monitoring will last for 30 years

3.5 Reporting

3.5.1 Technical

- Closure and post-closure plans will be required

- Annual post-closure monitoring report will be required and will include quarterly post-closure monitoring results and performance monitoring results

- Closure certification, survey plat, record of wastes, and deed notification will be required

- Public health evaluation will be conducted every five years

- Post-closure certification will be required

- Release from financial assurance will be required

13

3.5.2 Cost

- Funding will be available
- OU 7–specific funding will be used for all activities
- All project management activities such as training, travel, outyear planning, work package development, administrative support, Central Planning support, and reporting will be covered under the project support work package.

3.5.3 Schedule

- Closure plan is due to the regulatory agencies 180 days (130 working days) before closure
- Post-closure plan is due to the regulatory agencies 180 days (130 working days) before closure
- The regulatory agencies have 90 days (60 working days) to review the closure and post-closure plans
- Closure certification is due 60 days (40 working days) after closure
- Survey plat is due 60 days (40 working days) after closure
- Record of wastes is due 60 days (40 working days) after closure certification
- Deed notification is due 60 days (40 working days) after closure certification
- Post-closure certification is due 60 days (40 working days) after 30-year post-closure care period
- DOE is released from financial assurance/responsibility for the site by the state regulatory authority 60 days (40 working days) after post-closure certification
- Annual OU 7 post-closure monitoring report is due March 1 of every year
- Public health evaluation is due March 1 every five years

4. FISCAL-YEAR NARRATIVES

Narratives discussing OU 7 activities for each fiscal year are presented below. Specific milestones for each fiscal year are presented in Section 5.

Fiscal Year 1995

Fiscal year (FY) 1995 tasks will include the completion of the baseline risk assessment and the soils and groundwater assessment. The conceptual remedial design will be completed and the draft IM/IRA decision document will be submitted to the regulatory agencies. After approval of the IM/IRA decision document, the remedial design phase will begin. The IM/IRA design work plan is scheduled to be completed and approved by the end of FY95. Title II remedial design will begin in FY95.

Fiscal Year 1996

Title II designs will be submitted to the regulatory agencies in late FY96. The IM/IRA Implementation Document will be developed during FY96 and the final IM/IRA Implementation Document will be delivered to the regulatory agencies in late FY96. The construction process will begin in mid FY96 and will include preparation of the bid package, evaluation of proposals, and construction contract award.

Fiscal Year 1997

Construction of presumptive remedies and remedial actions will begin in mid FY97. Initial construction activities include pond and soil removal. Construction of the leachate collection and treatment system and the groundwater collection and treatment system will be completed within FY97.

Construction of the multilayer cap is scheduled to start in late FY97. Closure (or cap construction) must begin no later than 30 days after receipt of the final volume of hazardous waste. Final closure must be completed within 180 days after receipt of the final volume of waste. Construction of the gas collection and treatment system will be concurrent with the multilayer cap.

A closure plan will be developed and submitted to the regulatory agencies. A post-closure plan, which will identify post-closure activities, will also be submitted.

Fiscal Year 1998

All monitoring and treatment systems are scheduled to begin operations after construction activities have ended in mid FY98. OU 7 post-closure groundwater monitoring will begin in FY98. Groundwater samples will be collected quarterly. The operation of the groundwater collection and treatment system, gas collection and treatment system, and leachate collection and treatment system will begin in FY98.

After closure, DOE or EG&G must submit a closure certification and a survey plat. The closure certification must be signed by an independent registered professional engineer (or independent qualified soil scientist) and certify that the closure has been conducted in accordance with the closure plan. The survey plat must be prepared and certified by a professional land surveyor licensed in the State of Colorado and must indicate the location of hazardous waste disposal units with respect to permanently surveyed benchmarks. The survey plat will be submitted to the state regulatory authority or the EPA regional administrator and the local land authority.

DOE or EG&G must submit a record of the type, location, and quantity of hazardous wastes disposed to the state no later than 60 days after certification of closure. After closure, DOE or EG&G must record a notation on the deed to the facility property noting that the property has been used to manage hazardous wastes, its use is restricted, and a survey plat and record of wastes have been filed with the local land authority and the state director. DOE or EG&G must also submit a copy of the notation to the deed and a certification stating that the notation has been filed to the state regulatory authority (EPA 1987).

Fiscal Year 1999 through Fiscal Year 2002

OU 7 post-closure groundwater monitoring will continue during the period from FY99 through FY02 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system, groundwater collection and treatment system, and leachate collection and treatment system will be operational during the period from FY99 through FY02. Routine maintenance and inspection of the multilayer cap will continue during the period from FY99 through FY02.

Fiscal Year 2003

OU 7 post-closure groundwater monitoring will continue during FY03 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system, groundwater collection and treatment system, and leachate collection and treatment system will be operational during FY03. Routine maintenance and inspection of the multilayer cap will continue during FY03. A public health evaluation of the effectiveness of the remedial actions will be completed in FY03.

Fiscal Year 2004 through Fiscal Year 2007

OU 7 post-closure groundwater monitoring will continue during the period from FY04 through FY07 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system, groundwater collection and treatment system, and leachate collection and treatment system will be operational during the period from FY04 through FY07. Routine maintenance and inspection of the multilayer cap will continue during the period from FY04 through FY07.

Fiscal Year 2008

OU 7 post-closure groundwater monitoring will continue during FY08 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system, groundwater collection and treatment system, and leachate collection and treatment system will be operational during FY08. Routine maintenance and inspection of the multilayer cap will continue during FY08. A public health evaluation of the effectiveness of the remedial actions will be completed in FY08.

Fiscal Year 2009 through Fiscal Year 2012

OU 7 post-closure groundwater monitoring will continue during the period from FY09 through FY12 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the

27

analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system, groundwater collection and treatment system, and leachate collection and treatment system will be operational during the period from FY09 through FY12. The groundwater treatment and collection system and the leachate collection and treatment system will be evaluated during FY09 to determine their effectiveness. Assuming that these remedial actions have been effective, a request will be made to cease operation of these treatment systems. Routine maintenance and inspection of the multilayer cap will continue during the period from FY09 through FY12.

Fiscal Year 2013

OU 7 post-closure groundwater monitoring will continue during FY13 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies. The gas collection and treatment system will be operational during FY13. Routine maintenance and inspection of the multilayer cap will continue during FY13. A public health evaluation of the effectiveness of the remedial actions will be completed in FY13.

Fiscal Year 2014 through Fiscal Year 2017

OU 7 post-closure groundwater monitoring will continue during the period from FY14 through FY17 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies. The gas collection and treatment system will be operational during the period from FY14 through FY17. Routine maintenance and inspection of the multilayer cap will continue during the period from FY14 through FY17.

Fiscal Year 2018

OU 7 post-closure groundwater monitoring will continue during FY18 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies. The gas collection and treatment system will be operational during FY18. Routine maintenance and inspection of the multilayer cap will continue

during FY18. A public health evaluation of the effectiveness of the remedial actions will be completed in FY18.

Fiscal Year 2019 through Fiscal Year 2022

OU 7 post-closure groundwater monitoring will continue during the period from FY19 through FY22 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system will be operational during the period from FY19 through FY22. Routine maintenance and inspection of the multilayer cap will continue during the period from FY19 through FY22.

Fiscal Year 2023

OU 7 post-closure groundwater monitoring will continue during FY23 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system will be operational during FY23. Routine maintenance and inspection of the multilayer cap will continue during FY23. A public health evaluation of the effectiveness of the remedial actions will be completed in FY23.

Fiscal Year 2024 through Fiscal Year 2027

OU 7 post-closure groundwater monitoring will continue during the period from FY24 through FY27 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted to the regulatory agencies in accordance with the CCR. The gas collection and treatment system will be operational during the period from FY24 through FY27. Routine maintenance and inspection of the multilayer cap will continue during the period from FY24 through FY27.

Fiscal Year 2028

OU 7 post-closure groundwater monitoring will continue during FY28 and will consist of monitoring four wells quarterly. Each well will be sampled, and the groundwater will be analyzed. A report detailing the results of the analyses will be developed and submitted

to the regulatory agencies in accordance with the CCR. The gas collection and treatment system will be operational during FY28. Routine maintenance and inspection of the multilayer cap will continue during FY28. A public health evaluation of the effectiveness of the remedial actions will be completed in FY28. The effectiveness of the remedial actions will be evaluated to determine the necessity of continued monitoring.

A post-closure care certification must be submitted by DOE or EG&G to the state director no later than 60 days after the completion of the 30-year post-closure care period. The certification must be signed by DOE or EG&G and by an independent registered professional engineer (or independent qualified soil scientist). The purposes of the post-closure care certification are to verify that the post-closure care activities have been conducted in accordance with the approved plan and to ensure that terminating the post-closure care period will not pose a threat to human health and the environment.

DOE–EG&G will be released from financial assurance/responsibility for post-closure care of the landfill by the state regulatory authority if closure and post-closure care has been completed in accordance with the approved closure and post-closure plans (EPA 1987) 120 days after the post-closure care period is complete.

5. SCHEDULE

A schedule for the design, construction, operation, and maintenance of remedial actions and post-closure monitoring is included in Figure 1. Milestones associated with these activities are listed below.

Milestones

Fiscal Year 1994	
Readiness review	05 Jul 1994
Fieldwork complete	28 Sep 1994
Fiscal Year 1995	
Analytical work complete	02 Feb 1995
Baseline risk assessment complete	03 Mar 1995
Draft IM/IRA decision document complete	03 May 1995
Draft IM/IRA work plan complete	03 Jul 1995
Final IM/IRA work plan complete	06 Sep 1995
Fiscal Year 1996	
Final IM/IRA decision document complete	03 Sep 1996
Draft Title II design	03 Sep 1996
Fiscal Year 1997	
Closure plan	18 Nov 1996
Post-closure plan	18 Nov 1996
Final Title II design	03 Dec 1996
Construction begins	07 Mar 1997
Remediate pond and soils	16 Jul 1997
Leachate collection and treatment system complete	12 Aug 1997
Groundwater collection and treatment system complete	13 Aug 1997
Fiscal Year 1998	
Multilayer cap complete	02 Mar 1998
Gas collection system complete	02 Mar 1998
Post-closure care begins	03 Mar 1998
Closure certification	28 Apr 1998
Survey plat	28 Apr 1998
Record of wastes	28 Apr 1998
Deed notification	28 Apr 1998

Fiscal Year 1999 through 2002	
Annual post-closure monitoring report	01 Mar 1999
Annual post-closure monitoring report	01 Mar 2000
Annual post-closure monitoring report	01 Mar 2001
Annual post-closure monitoring report	01 Mar 2002
Fiscal Year 2003	
Annual post-closure monitoring report	01 Mar 2003
Public health evaluation	01 Mar 2003
Fiscal Year 2004 through 2007	
Annual post-closure monitoring report	01 Mar 2004
Annual post-closure monitoring report	01 Mar 2005
Annual post-closure monitoring report	01 Mar 2006
Annual post-closure monitoring report	01 Mar 2007
Fiscal Year 2008	
Annual post-closure monitoring report	01 Mar 2008
Public health evaluation	01 Mar 2008
Fiscal Year 2009 through 2012	
Evaluation of groundwater collection and treatment system	01 Mar 2009
Evaluation of leachate collection and treatment system	01 Mar 2009
Annual post-closure monitoring report	01 Mar 2009
Annual post-closure monitoring report	01 Mar 2010
Annual post-closure monitoring report	01 Mar 2011
Annual post-closure monitoring report	01 Mar 2012
Fiscal Year 2013	
Annual post-closure monitoring report	01 Mar 2013
Public health evaluation	01 Mar 2013
Fiscal Year 2014 through 2017	
Annual post-closure monitoring report	01 Mar 2014
Annual post-closure monitoring report	01 Mar 2015
Annual post-closure monitoring report	01 Mar 2016
Annual post-closure monitoring report	01 Mar 2017
Fiscal Year 2018	
Annual post-closure monitoring report	01 Mar 2018
Public health evaluation	01 Mar 2018

Fiscal Year 2019 through 2022	
Annual post-closure monitoring report	01 Mar 2019
Annual post-closure monitoring report	01 Mar 2020
Annual post-closure monitoring report	01 Mar 2021
Annual post-closure monitoring report	01 Mar 2022
Fiscal Year 2023	
Annual post-closure monitoring report	01 Mar 2023
Public health evaluation	01 Mar 2023
Fiscal Year 2024 through 2027	
Annual post-closure monitoring report	01 Mar 2024
Annual post-closure monitoring report	01 Mar 2025
Annual post-closure monitoring report	01 Mar 2026
Annual post-closure monitoring report	01 Mar 2027
Fiscal Year 2028	
Annual post-closure monitoring report	01 Mar 2028
Public health evaluation	01 Mar 2028
Evaluation of remedial actions	01 Mar 2028
Post-closure activities completed	02 Mar 2028
Post-closure certification	27 Apr 2028
Release from financial assurance for post-closure care of facility	23 Jun 2028

33
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6. COST

Cost estimates for closing the landfill and for post-closure groundwater monitoring and maintenance were developed using presumptive remediation. The components of the presumptive remedy include a multilayer cap, source area groundwater control, leachate collection and treatment, landfill gas collection and treatment, and institutional controls. Cost estimates for reporting are also included.

Cost estimates were developed using current-year unit prices. Table 1 contains the unit costs for all activities. Construction costs are broken down into labor, equipment, and materials, where appropriate and where the data was available. Overhead and profit (O&P) was also added where appropriate. Engineering estimates are based on current hourly rates. Contingency fees were added to account for the maximum costs of closure.

Unit costs were estimated using several sources. The majority of the construction costs were developed using the Means index (R.S. Means Company 1993). Other costs were developed using vendor quotes, catalog prices, and corporate experience.

Cost estimates are summarized in Table 2. Costs are escalated by 5 percent per year to account for inflation.

7. REFERENCES

DOE. 1988. Present Landfill Closure Plan. U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado. July 1.

DOE. 1991a. Phase I RFI/RI Work Plan for Operable Unit No. 7, Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203), Rocky Flats Plant, Golden, Colorado. December.

DOE. 1991b. Federal Facility Agreement and Consent Order (Interagency Agreement [IAG]: U.S. DOE, U.S. EPA, and CDH), U.S. Department of Energy, Washington, D.C., January 22.

EPA. 1987. RCRA Guidance Manual for Subpart G Closure and Post Closure Care Standards and Subpart H Cost Estimating Requirements. PB87-158978. January.

EPA. 1991. Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites. EPA/540/P-91/001. February.

EPA. 1993a. Presumptive Remedy for CERCLA Municipal Landfill Sites. Office of Solid Waste Emergency and Response. EPA/540/F-93/035. September.

EPA. 1993b. Superfund Accelerated Cleanup Bulletin, Presumptive Remedies, for Municipal Landfill Sites. Office of Solid Waste Emergency and Response. PB93-963269.

R.S. Means Company, Inc. 1993. *Means Building Construction Cost Data*, Western Edition, 7th Annual Edition. Construction Publishers and Consultants.

TABLES

Table 1 Operable Unit 7 Unit Costs

Item	Size	Units	Unit Costs Material	Labor	Equip	Unit Total	Unit Total with O&P	Total Cost	Notes
IM/IRA SUPPORT, DOCUMENTS, AND DESIGN									
Field Investigation									
Finalize Tech Memo	1		$9,600	$13,887	$0	$23,487	$23,487	$23,487	
Field Sampling	1		$149,411	$179,605	$0	$329,016	$329,016	$329,016	
Project Management	1		$2,220	$54,230	$0	$56,450	$56,450	$56,450	
Miscellaneous Tasks	1		$260	$11,857	$0	$12,117	$12,117	$12,117	
Subtotal Field Investigation								**$421,070**	
IM/IRA Documents and Design									
Baseline Risk Assessment	1		$99,022	$280,727	$0	$379,749	$379,749	$379,749	
IM/IRA Decision Document	1		$124,630	$433,836	$0	$558,466	$558,466	$558,466	
Remedial Design	1		$129,931	$103,540	$0	$233,471	$233,471	$233,471	
Project Management	1		$6,645	$169,940	$0	$176,585	$176,585	$176,585	
Miscellaneous Tasks	1		$2,930	$30,402	$0	$33,332	$33,332	$33,332	
Subtotal IM/IRA Documents and Design								**$1,381,603**	
Total IM/IRA Documents and Design								**$1,802,673**	
PERMITTING AND NEPA INTEGRATION	**1**		**$100,000**	**$0**	**$0**	**$100,000**	**$100,000**	**$100,000**	
CONSTRUCTION									
Stabilize ELP Slope									
Excavate Slumped Soils	3700	cubic yards	$0.00	$0.70	$2.43	$3.13	$3.75	$13,875	
Drainage Layer	740	cubic yards	$7.50	$4.54	$0.62	$12.66	$16.20	$11,988	1 foot gravel layer
Replace Soils	3700	cubic yards	$0.00	$0.29	$0.82	$1.11	$1.34	$4,958	Dozer
Compact Soils	3700	cubic yards	$0.00	$0.36	$1.15	$1.51	$1.82	$6,734	Vibrating roller
Total Stabilize ELP Slope								**$37,555**	
Pond Sediments and Soils									
Construct Slurry Wall	12000	square feet	$10.00	$11.15	$6.80	$27.95	$36.00	$432,000	
Dewater Pond	2	days	$0.00	$71.50	$19.90	$91.40	$133.00	$266	Pump to truck
Transport water	1	week	$0.00	$0.00	$950.00	$950.00	$950.00	$950	Transport water to OU 1 or OU 2 treatment system
Excavate Sediments	4000	cubic yards	$0.00	$0.25	$1.29	$1.54	$1.80	$7,200	4,000 cubic yards of sediments, 1 foot depth
Drain Sediments	30000	square feet	$0.20	$0.00	$0.00	$0.20	$0.20	$6,000	Plastic sheeting
Excavate Sediments and Soils	11800	cubic yards	$0.00	$0.25	$1.29	$1.54	$1.80	$21,240	Includes pond seds and soil hot spots, 3/4 cubic yard backhoe
Haul Sediments and Soils	11800	cubic yards	$0.00	$0.49	$1.12	$1.61	$1.99	$23,482	12 cubic yards dump, 1/4 miles, pond seds and hot spots
Spread Sediments and Soils	11800	cubic yards	$0.00	$0.29	$0.82	$1.11	$1.34	$15,812	Dozer, pond seds and hot spots
Total Pond Sediments and Soils								**$506,950**	
Leachate Collection and Treatment System									
Extend Trench									Approximately 700 feet
Excavation	12000	cubic yards	$0.00	$0.70	$2.43	$3.13	$3.75	$45,000	300 horsepower dozer, 300-foot haul
Drainage Gravel	1200	cubic yards	$7.50	$4.54	$0.62	$12.66	$16.20	$19,440	12 inches deep

1 Unit Total with O&P includes overhead and profit

Table 1 Operable Unit 7 Unit Costs

Item	Size	Units	Unit Costs Material	Labor	Equip	Unit Total	Unit Total with O&P[1]	Total Cost	Notes
Piping	700	linear feet	$1.92	$1.67	$0.00	$3.59	$4.80	$3,360	6 inches perforated clay
Clay Layer	870	cubic yards	$5.75	$0.53	$1.35	$7.63	$8.65	$7,526	Select fill for embankments
Compaction	870	cubic yards	$0.00	$0.36	$1.15	$1.51	$1.82	$1,583	Vibrating roller
Leachate Sump									
Excavation	60	cubic yards	$0.00	$4.50	$4.80	$9.30	$12.20	$732	3/4 cubic yard backhoe
Gravel Base	264	square feet	$0.15	$0.12	$0.02	$0.29	$0.38	$100	6 inches under floor slab
Concrete Slab - 6"	4.9	cubic yards	$60.50	$19.90	$0.73	$81.13	$101.00	$495	Includes forms, rebar
Concrete Walls - 8"	7.7	cubic yards	$86.00	$107.00	$3.97	$196.97	$272.00	$2,094	Includes forms, rebar
Waterproofing	500	square feet	$1.39	$0.51	$0.25	$2.15	$2.61	$1,305	1/8 inch sprayed on
Sump Pump	2	pumps	$195.00	$58.00	$0.00	$253.00	$305.00	$610	Plastic, 1.5 inches, 1/2 horsepower, auto
Storage Tank	1	tank	$3,700.00	$885.00	$0.00	$4,585.00	$5,425.00	$5,425	5,000 gallons, steel
Utilities									
Install Utility Poles	5	poles	$330.00	$183.00	$35.50	$548.50	$685.00	$3,425	
Install Cable	40	100 feet	$30.00	$87.50	$0.00	$117.50	$166.00	$6,640	
Install Box	1		$0.00	$0.00	$0.00	$0.00	$50.00	$50	
Install Wiring	1		$0.00	$0.00	$0.00	$0.00	$500.00	$500	
Install Panel Board	1		$0.00	$0.00	$0.00	$0.00	$1,000.00	$1,000	
Total Leachate Collection and Treatment System								**$99,286**	
Multilayer Cap									
Abandon existing wells	30	wells/vents	$140.00	$0.00	$1,470.00	$1,610.00	$1,610.00	$48,300	25 wells, each 25 feet deep, 4 vents
Compact Voids	1	week	$0.00	$0.00	$2,160.00	$2,160.00	$2,160.00	$2,160	3/4 cubic yard backhoe and operator
Install Foundation Layer									Compacted native soil/clay, 3 percent grade
Purchase	2E+05	tons	$2.00	$0.00	$0.00	$2.00	$2.00	$400,000	Western Aggregate 1/2 structural fill
Hauling	2E+05	tons	$0.00	$1.50	$0.00	$1.50	$1.50	$300,000	
Placement and Spreading	2E+05	cubic yards	$0.00	$0.29	$0.82	$1.11	$1.34	$227,800	Dozer, no compaction
Compaction	2E+05	cubic yards	$0.00	$0.38	$1.24	$1.62	$1.95	$331,500	Sheepsfoot roller
Install Gas Vent Layer									(see below)
Install Geogrid	1E+05	square yards	$3.24	$0.63	$0.00	$3.87	$3.87	$505,732	
Install Geosynthetic Clay Liner	1E+05	square yards	$3.69	$0.90	$0.00	$4.59	$4.59	$599,821	i.e. 1/4 inch Bentomat
Install Flexible Membrane Liner	1E+05	square yards	$0.81	$0.90	$0.00	$1.71	$1.71	$223,463	30 mil
Install Drainage Layer	43124	cubic yards	$9.50	$1.06	$2.69	$13.25	$13.25	$571,393	Buy, load, haul 2 miles, spread washed sand 200 horsepower dozer
Soil Cover (native)									
Excavation	43124	cubic yards	$0.00	$0.70	$2.43	$3.13	$3.75	$161,715	300 horsepower dozer; 300 feet common earth
Spreading	43124	cubic yards	$0.00	$0.49	$1.12	$1.61	$1.99	$85,817	12 cubic yards dump truck 1/4 mike round trip; 3.7 loads/hr
Compaction	43124	cubic yards	$0.00	$0.36	$1.15	$1.51	$1.51	$65,117	
Revegetation									
Soil Preparation	86248	cubic yards	$12.75	$1.06	$2.69	$16.50	$16.50	$1,423,092	2 feet topsoil, 5 mile haul, buy, load spread 200 horsepower dozer
Compaction	43124	cubic yards	$0.00	$0.36	$1.15	$1.51	$1.51	$65,117	
Seed	27	acres	$120.28	$0.00	$0.00	$120.28	$120.28	$3,248	Seed list as per attached
Seeding	27	acres	$877.00	$0.00	$0.00	$877.00	$877.00	$23,679	Fertilizer, disking, seeding, mulching, crimping, tacking
Subtotal Multilayer Cap								**$5,037,953**	
Construction Quality Assurance								$503,795	10 percent of total multilayer cap price
Total Multilayer Cap								**$5,541,749**	
Groundwater Collection and Treatment System									

1 Unit Total with O&P includes overhead and profit

Table 1 Operable Unit 7 Unit Costs

Item	Size	Units	Unit Costs Material	Labor	Equip	Unit Total	Unit Total with O&P	Total Cost	Notes
Install Extraction Wells									
Surveyor	4	stations	$120.00	$0.00	$0.00	$120.00	$120.00	$480	
Drill Rig	40	hours	$140.00	$0.00	$0.00	$140.00	$140.00	$5,600	Includes crew
Well Completion	4	wells	$500.00	$0.00	$0.00	$500.00	$500.00	$2,000	
Well Completion Materials	4	wells	$50.00	$0.00	$0.00	$50.00	$50.00	$200	
Standby	8	hours	$140.00	$0.00	$0.00	$140.00	$140.00	$1,120	
Mobilization	16	hours	$100.00	$0.00	$0.00	$100.00	$100.00	$1,600	
Pumps	4	pumps	$500.00	$0.00	$0.00	$500.00	$500.00	$2,000	
Miscellaneous Supplies	1		$1,000.00	$0.00	$0.00	$1,000.00	$1,000.00	$1,000	
Install Storage Tank									
Miscellaneous Supplies	1		$1,000.00	$0.00	$0.00	$1,000.00	$1,000.00	$1,000	
Install Piping	2000	feet	$4.80	$2.81	$0.00	$7.61	$9.90	$19,800	Pipe Insulation
Install Piping	2000	feet	$2.24	$7.05	$0.00	$9.29	$13.25	$26,500	2 inch PVC
Install Tanks	1	tank	$3,700.00	$885.00	$0.00	$4,585.00	$5,425.00	$5,425.00	5,000 gallons , steel
Utilities									
Install Utility Poles	5	poles	$330.00	$183.00	$35.50	$548.50	$685.00	$3,425	
Install Cable	40	100 feet	$30.00	$87.50	$0.00	$117.50	$166.00	$6,640	
Install Box	1		$0.00	$0.00	$0.00	$0.00	$50.00	$50	
Install Wiring	1		$0.00	$0.00	$0.00	$0.00	$500.00	$500	
Install Panel Board	1		$0.00	$0.00	$0.00	$0.00	$1,000.00	$1,000	
Total Groundwater Collection and Treatment System								**$78,340**	
Gas Collection System									
Install Geotextile Filter	1E+05	square yards	$0.54	$0.27	$0.00	$0.81	$0.81	$105,851	
Install Gas Vent Layer	43124	cubic yards	$3.50	$1.06	$2.69	$7.25	$8.45	$364,398	Washed sand
Install Pipes	10000	feet	$0.75	$1.41	$0.00	$2.16	$3.09	$30,900	4 inch PVC perforated pipe
Install Drain Rock	1000	cubic yards	$3.75	$1.06	$2.69	$7.50	$8.75	$8,750	Drain rock (gravel), 1 cubic yard per 10 inch PVC
Install Vacuum Blowers	2	fans	$5,425.00	$31.50	$0.00	$5,456.50	$6,450.00	$12,900	10 horsepower axial fan, 15,600 cubic feet/minute
Install Header	50	tee	$60.00	$70.00	$0.00	$130.00	$173.00	$8,650	Cleanout Tee (CIP)
Install Flarer	1	flare	*$100,000*	*$0.00*	*$0.00*	*$100,000*	*$100,000*	*$100,000*	*Flarer*
Install Geotextile Filter	1E+05	square yards	$0.54	$0.27	$0.00	$0.81	$0.81	$105,851	
Utilities									
Install Utility Poles	5	poles	$330.00	$183.00	$35.50	$548.50	$685.00	$3,425	
Install Cable	40	100 feet	$30.00	$87.50	$0.00	$117.50	$166.00	$6,640	
Install Box	1		$0.00	$0.00	$0.00	$0.00	$50.00	$50	
Install Wiring	1		$0.00	$0.00	$0.00	$0.00	$500.00	$500	
Install Panel Board	1		$0.00	$0.00	$0.00	$0.00	$1,000.00	$1,000	
Total Gas Collection System								**$748,914**	
Institutional Control - Fencing	4875	linear feet	$5.25	$2.42	$0.00	$7.67	$9.70	**$47,288**	
Subtotal Construction								**$7,022,526**	
Construction Support									
Water Truck for Dust Suppression	52	weeks	$800	$0	$250	$1,050	$1,050	$54,600	12 months construction
Health and Safety Labor	1920	hours	$0	$50	$0	$50	$50	$96,000	12 months construction
Health and Safety Supplies	12	months	$1,000	$0	$0	$1,000	$1,000	$12,000	12 months construction
Training	480	hours	$50	$0	$0	$50	$50	$24,000	16 hours per person, 30 people

1 Unit Total with O&P includes overhead and profit

Table 1 Operable Unit 7 Unit Costs

Item	Size	Units	Unit Costs Material	Labor	Equip	Unit Total	Unit Total with O&P[1]	Total Cost	Notes
Construction Management	3840	hours	$0	$150	$0	$150	$150	$576,000	12 months construction, 2 people
Inspections and QA/QC	1920	hours	$0	$90	$0	$90	$90	$172,800	12 months construction
Decontamination								$702,253	10 percent of total construction costs
Mobilization/Demobilization								$702,253	10 percent of total construction costs
Subtotal Including Construction Support								**$9,362,431**	
Contingency								$1,872,486	
Total Construction								**$11,234,918**	
OPERATION AND MAINTENANCE									
Groundwater Collection and Treatment									
Operating Labor	40	hours/month	$40.00	$0.00	$0.00	$40.00	$40.00	$1,600	2 hours/day
Maintenance Materials/Labor	1	month	$1,000.00	$0.00	$0.00	$1,000.00	$1,000.00	$1,000	
Utilities	1	month	$250.00	$0.00	$0.00	$250.00	$250.00	$250	
Performance Monitoring	4	wells	$1,370.00	$0.00	$0.00	$1,370.00	$1,370.00	$5,480	
Shipping	4	deliveries	$100.00	$0.00	$0.00	$100.00	$100.00	$400	
Transport Water	1	day	$0.00	$160.00	$325.00	$485.00	$485.00	$485	5,000 gallons, hazardous materials truck
Total Groundwater Collection and Treatment								**$9,215**	**per month**
Gas Collection System									
Operating Labor	40	hours/month	$40.00	$0.00	$0.00	$40.00	$40.00	$1,600	
Maintenance Materials/Labor	1	month	$1,000.00	$0.00	$0.00	$1,000.00	$1,000.00	$1,000	
Utilities	1	month	$250.00	$0.00	$0.00	$250.00	$250.00	$250	
Total Gas Collection System								**$2,850**	**per month**
Leachate Collection and Treatment System									
Operating Labor	40	hours/month	$40.00	$0.00	$0.00	$40.00	$40.00	$1,600	
Maintenance Materials/Labor	1	month	$1,000.00	$0.00	$0.00	$1,000.00	$1,000.00	$1,000	
Utilities	1	month	$250.00	$0.00	$0.00	$250.00	$250.00	$250	
Performance Monitoring	1	sample	$1,370.00	$0.00	$0.00	$1,370.00	$1,370.00	$1,370	
Shipping	1	delivery	$100.00	$0.00	$0.00	$100.00	$100.00	$100	
Transport Water	1	day	$160.00	$0.00	$325.00	$485.00	$485.00	$485	
Total Leachate Collection and Treatment System								**$4,805**	**per month**
Multilayer Cap									
Maintenance Labor	40	hours/month	$40.00	$0.00	$0.00	$40.00	$40.00	$1,600	
Maintenance Materials/labor	1	month	$1,000.00	$0.00	$0.00	$1,000.00	$1,000.00	$1,000	
Total Multilayer Cap								**$2,600**	
Total Operation and Maintenance								**$19,470**	
MONITORING									
Labor	64	hours	$40.00	$0.00	$0.00	$40.00	$40.00	$2,560	2 person crew 4 days per quarter

1 Unit Total with O&P includes overhead and profit

Table 1 Operable Unit 7 Unit Costs

Item	Size	Units	Unit Costs Material	Labor	Equip	Unit Total	Unit Total with O&P	Total Cost	Notes
Analyses Full RCRA Suite	4	wells	$1,370.00	$0.00	$0.00	$1,370.00	$1,370.00	$5,480	
Shipping	4	deliveries	$100.00	$0.00	$0.00	$100.00	$100.00	$400	48 quart cooler
Total Monitoring								**$8,440**	**per quarter**
REPORTING									
Closure Plan	1		$250,000	$0	$0	$250,000	$250,000	$250,000	
Post-closure Plan	1		$50,000	$0	$0	$50,000	$50,000	$50,000	
Closure Certification	1		$25,000	$0	$0	$25,000	$25,000	$25,000	
Survey Plat	1		$15,000	$0	$0	$15,000	$15,000	$15,000	
Record of Wastes	1		$15,000	$0	$0	$15,000	$15,000	$15,000	
Deed of Notation	1		$15,000	$0	$0	$15,000	$15,000	$15,000	
Post-closure Monitoring Report	1		$50,000	$0	$0	$50,000	$50,000	$50,000	Yearly
Public Health Evaluation	1		$250,000	$0	$0	$250,000	$250,000	$250,000	Once every five years
Post-closure Certification	1		$25,000	$0	$0	$25,000	$25,000	$25,000	
Release from Financial Assurance	1		$15,000	$0	$0	$15,000	$15,000	$15,000	

1 Unit Total with O&P includes overhead and profit

Table 2 Operable Unit 7 Escalated Fiscal-Year Costs

	Current Costs	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04
Field Investigations	$421,070	$421,070										
IM/IRA Documents and Design	$1,381,603	$71,843	$1,117,717	$192,043								
Permitting	$100,000			$110,250								
CONSTRUCTION												
Stabilize ELP Slope	$37,555				$43,475							
Pond Sediments and Soils	$506,950				$586,858							
Leachate Collection and Treatment System	$99,286				$114,935							
Multilayer Cap	$5,541,749					$6,736,030						
Groundwater Collection and Treatment Syste	$78,340				$90,688							
Gas Collection System	$748,914					$910,310						
Institutional Control - Fencing	$47,288					$57,478						
Construction Support												
Water Truck for Dust Suppression	$54,600				$6,321	$59,730						
Health and Safety Labor	$96,000				$11,113	$105,020						
Health and Safety Supplies	$12,000				$1,389	$13,127						
Training	$24,000				$2,778	$26,255						
Construction Management	$576,000				$66,679	$630,118						
Inspections and QA/QC	$172,800				$20,004	$189,036						
Decontamination	$702,253				$81,295	$768,233						
Mobilization/Demobilization	$702,253				$81,295	$768,233						
Subtotal Construction	**$9,399,986**				**$1,106,830**	**$10,263,571**						
Contingency	$1,872,486				$221,366	$2,052,714						
Total Construction	**$11,272,473**				**$1,328,196**	**$12,316,285**						
OPERATION AND MAINTENANCE												
Groundwater Collection and Treatment	$110,580					$134,411	$141,131	$148,188	$155,597	$163,377	$171,546	$180,123
Gas Collection System	$34,200					$41,570	$43,649	$45,831	$48,123	$50,529	$53,055	$55,708
Leachate Collection and Treatment System	$57,660					$70,086	$73,590	$77,270	$81,133	$85,190	$89,450	$93,922
Multilayer Cap	$31,200					$37,924	$39,820	$41,811	$43,902	$46,097	$48,401	$50,822
Total Operation and Maintenance	**$233,640**					**$283,991**	**$298,190**	**$313,100**	**$328,755**	**$345,193**	**$362,452**	**$380,575**
MONITORING	**$33,760**					**$41,035**	**$43,087**	**$45,242**	**$47,504**	**$49,879**	**$52,373**	**$54,991**
REPORTING												
Closure Plan	$250,000			$275,625								
Post-closure Plan	$50,000			$55,125								
Closure Certification	$25,000					$30,388						
Survey Plat	$15,000					$18,233						
Record of Wastes	$15,000					$18,233						
Deed of Notation	$15,000					$18,233						
Post-closure Monitoring Report	$50,000					$60,775	$63,814	$67,005	$70,355	$73,873	$77,566	$81,445
Public Health Evaluation	$250,000										$387,832	
Post-closure Certification	$25,000											
Release from Financial Assurance	$15,000											
TOTAL		**$492,913**	**$1,117,717**	**$633,043**	**$1,328,196**	**$12,787,172**	**$405,092**	**$426,348**	**$446,614**	**$468,944**	**$880,224**	**$517,011**

Table 2 Operable Unit 7 Escalated Fiscal-Year Costs

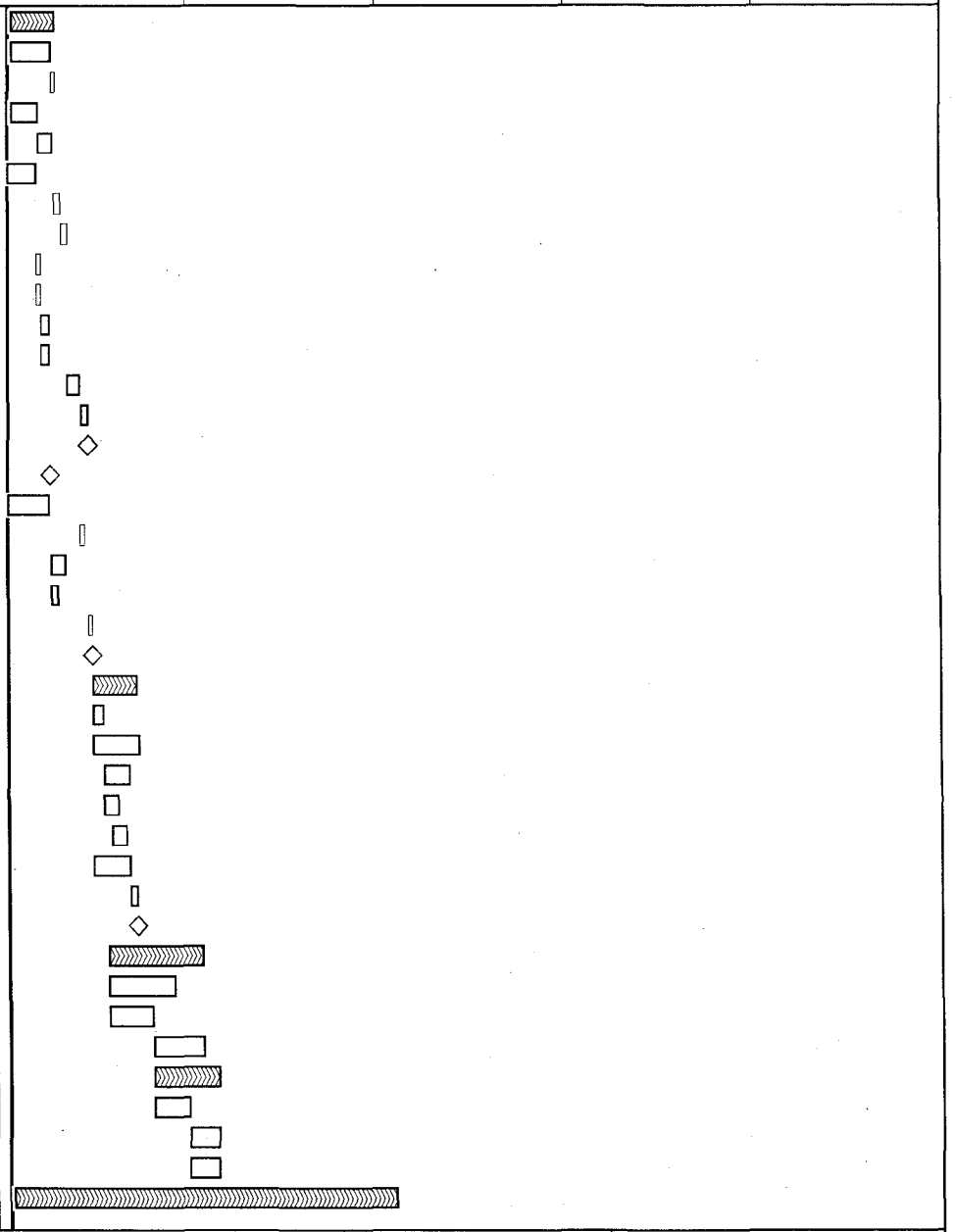
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Field Investigations													
IM/IRA Documents and Design													
Permitting													
CONSTRUCTION													
Stabilize ELP Slope													
Pond Sediments and Soils													
Leachate Collection and Treatment System													
Multilayer Cap													
Groundwater Collection and Treatment Syste													
Gas Collection System													
Institutional Control - Fencing													
Construction Support													
Water Truck for Dust Suppression													
Health and Safety Labor													
Health and Safety Supplies													
Training													
Construction Management													
Inspections and QA/QC													
Decontamination													
Mobilization/Demobilization													
Subtotal Construction													
Contingency													
Total Construction													
OPERATION AND MAINTENANCE													
Groundwater Collection and Treatment	$189,129	$198,586	$208,515	$218,941									
Gas Collection System	$58,494	$61,418	$64,489	$67,714	$71,099	$74,654	$78,387	$82,306	$86,422	$90,743	$95,280	$100,044	$105,046
Leachate Collection and Treatment System	$98,618	$103,549	$108,727	$114,163									
Multilayer Cap	$53,363	$56,031	$58,832	$61,774	$64,863	$68,106	$71,511	$75,087	$78,841	$82,783	$86,922	$91,268	$95,832
Total Operation and Maintenance	**$399,604**	**$419,584**	**$440,563**	**$462,591**	**$135,962**	**$142,760**	**$149,898**	**$157,393**	**$165,263**	**$173,526**	**$182,202**	**$191,312**	**$200,878**
MONITORING	**$57,741**	**$60,628**	**$63,660**	**$66,842**	**$70,185**	**$73,694**	**$77,379**	**$81,247**	**$85,310**	**$89,575**	**$94,054**	**$98,757**	**$103,695**
REPORTING													
Closure Plan													
Post-closure Plan													
Closure Certification													
Survey Plat													
Record of Wastes													
Deed of Notation													
Post-closure Monitoring Report	$85,517	$89,793	$94,282	$98,997	$103,946	$109,144	$114,601	$120,331	$126,348	$132,665	$139,298	$146,263	$153,576
Public Health Evaluation				$494,983					$631,738				
Post-closure Certification													
Release from Financial Assurance													
TOTAL	$542,862	$570,005	$598,505	$1,123,413	$310,093	$325,598	$341,877	$358,971	$1,008,657	$395,766	$415,554	$436,332	$458,148

Table 2 Operable Unit 7 Escalated Fiscal-Year Costs

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	TOTAL
Field Investigations												**$421,070**
IM/IRA Documents and Design												**$1,381,603**
Permitting												**$110,250**
CONSTRUCTION												
Stabilize ELP Slope												$43,475
Pond Sediments and Soils												$586,858
Leachate Collection and Treatment System												$114,935
Multilayer Cap												$6,736,030
Groundwater Collection and Treatment Syste												$90,688
Gas Collection System												$910,310
Institutional Control - Fencing												$57,478
Construction Support												
Water Truck for Dust Suppression												$66,051
Health and Safety Labor												$116,133
Health and Safety Supplies												$14,517
Training												$29,033
Construction Management												$696,798
Inspections and QA/QC												$209,039
Decontamination												$849,528
Mobilization/Demobilization												$849,528
Subtotal Construction												**$11,370,401**
Contingency												$2,274,080
Total Construction												**$13,644,481**
OPERATION AND MAINTENANCE												
Groundwater Collection and Treatment												$1,909,544
Gas Collection System	$110,298	$115,813	$121,604	$127,684	$134,068	$140,772	$147,810	$155,201	$162,961	$171,109	$179,665	$2,941,548
Leachate Collection and Treatment System												$995,698
Multilayer Cap	$100,623	$105,654	$110,937	$116,484	$122,308	$128,423	$134,845	$141,587	$148,666	$156,099	$163,904	$2,683,518
Total Operation and Maintenance	**$210,922**	**$221,468**	**$232,541**	**$244,168**	**$256,376**	**$269,195**	**$282,655**	**$296,788**	**$311,627**	**$327,209**	**$343,569**	**$8,530,308**
MONITORING	**$108,879**	**$114,323**	**$120,040**	**$126,041**	**$132,344**	**$138,961**	**$145,909**	**$153,204**	**$160,864**	**$168,908**	**$177,353**	**$2,903,704**
REPORTING												
Closure Plan												$275,625
Post-closure Plan												$55,125
Closure Certification												$30,388
Survey Plat												$18,233
Record of Wastes												$18,233
Deed of Notation												$18,233
Post-closure Monitoring Report	$161,255	$169,318	$177,784	$186,673	$196,006	$205,807	$216,097	$226,902	$238,247	$250,159	$262,667	$4,300,509
Public Health Evaluation	$806,275					$1,029,034					$1,313,337	$4,663,198
Post-closure Certification											$131,334	$131,334
Release from Financial Assurance											$78,800	$78,800
TOTAL	$1,287,331	$505,109	$530,364	$556,882	$584,726	$1,642,097	$844,661	$875,894	$710,739	$746,276	$2,307,060	$39,551,093

FIGURES

ACTIVITY ID	ACTIVITY DESCRIPTION	ORIG DUR	EARLY START	EARLY FINISH
1000	PHASE I DATA ASSESSMENT	60	31JAN94	25APR94
1010	PHASE I DATA EVALUATION	55	31JAN94	18APR94
1020	PHASE I DATA PRESENTATION	5	19APR94	25APR94
1030	SCOPING MEETINGS/DQO DEVELOPMENT	39	1FEB94	25MAR94
1040	OU 7 REVISED WORKPLAN TECH MEMO	20	25MAR94	22APR94
1050	OUTYEAR PLANNING DOCUMENT	41	25JAN94	22MAR94
1060	EG&G/DOE REVIEW WORKPLAN TM	10	25APR94	6MAY94
1065	REVISED WORKPLAN TM	10	9MAY94	20MAY94
1070	EG&G REVIEW DQO'S	6	22MAR94	29MAR94
1080	EG&G REVIEW OUTYEAR PLANNING DOCUMEN	6	22MAR94	29MAR94
1090	REVISE DQO'S	12	30MAR94	15APR94
1100	REVISE OUTYEAR PLANNING DOCUMENT	12	30MAR94	15APR94
1110	EPA/CDH REVIEW WORKPLAN TM	16	20MAY94	13JUN94
1114	REVISE WORKPLAN TM	10	14JUN94	27JUN94
1117	OU 7 WORKPLAN TM APPROVED	0	29JUN94	28JUN94
1120	OU 7 MTS CONTRACT	0	18APR94	15APR94
1130	WORK PLAN IMPLEMENTATION PLAN	58	25JAN94	15APR94
1140	HEALTH AND SAFETY PLAN ADDENDUM	6	14JUN94	21JUN94
1150	TRAIN AND BADGE S/C PERSONNEL	21	19APR94	17MAY94
1160	OBTAIN PERMITS	10	19APR94	2MAY94
1170	READINESS REVIEW	5	28JUN94	5JUL94
1180	READINESS REVIEW COMPLETE	0	6JUL94	5JUL94
2000	RFI/RI - IMPLEMENTATION OF TECH MEMO	60	6JUL94	28SEP94
2010	MOBILIZE	15	6JUL94	26JUL94
2015	DATA MANAGEMENT QA	63	6JUL94	30CT94
2020	MONITOR WELL INSTALLATION	35	27JUL94	14SEP94
2030	SOIL SAMPLING	21	27JUL94	24AUG94
2040	MONITOR WELL SAMPLING	21	10AUG94	8SEP94
2045	OTHER FIELD ACTIVITIES	51	6JUL94	15SEP94
2050	DEMOBILIZE	10	15SEP94	28SEP94
2060	FIELD WORK COMPLETE	0	29SEP94	28SEP94
3000	ANALYTICAL	123	3AUG94	2FEB95
3010	HOT SAMPLE ANALYSIS	90	3AUG94	9DEC94
3020	COLD SAMPLE ANALYSIS	60	3AUG94	26OCT94
3030	DATA VALIDATION	63	27OCT94	2FEB95
4000	BASELINE RISK ASSESSMENT	84	27OCT94	3MAR95
4010	PLF ASSESSMENT	42	27OCT94	4JAN95
4020	ELP AREA SOILS ASSESSMENT	42	5JAN95	3MAR95
4030	OU 7 GROUNDWATER ASSESSMENT	42	5JAN95	3MAR95
5000	IM/IRA DECISION DOCUMENT (DD)	506	31JAN94	9FEB96



Plot Date 14APR94
Data Date 25JAN94
Project Start 25JAN94
Project Finish 23JUN28

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

OU7D

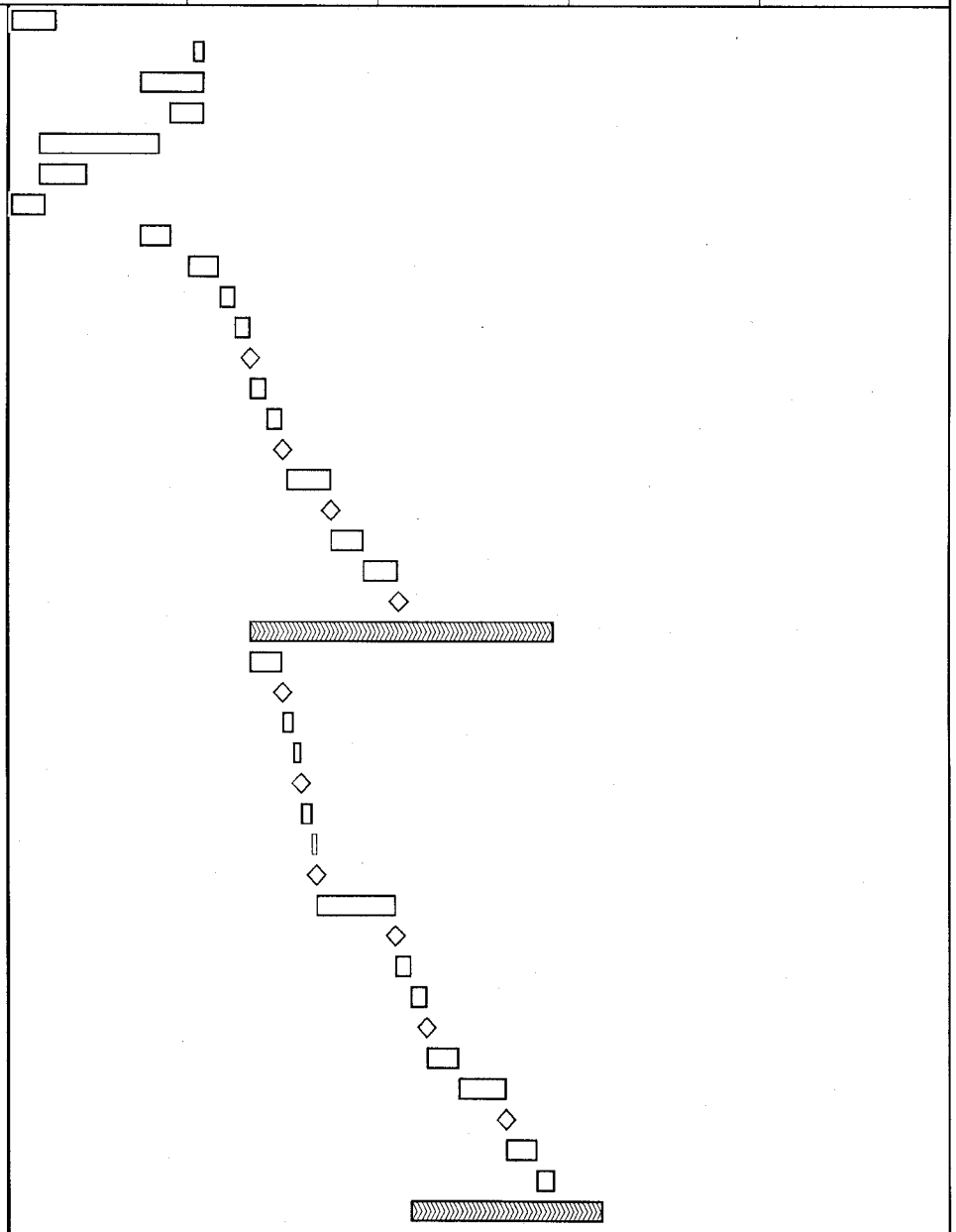
Sheet 1 of 4

Hannock
Hannock

EG&G ROCKY FLATS
OU 7 PRESENT LANDFILL
FIGURE 1 OUTYEAR SCHEDULE

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	ORIG DUR	EARLY START	EARLY FINISH
5010	ARAR'S DEVELOPMENT	60	31JAN94	25APR94
5020	MODELING SUPPORT	15	13JAN95	2FEB95
5030	CONCEPTUAL DESIGN	80	4OCT94	2FEB95
5040	DATA EVALUATION	42	29NOV94	2FEB95
5050	ENVIRONMENTAL ASSESSMENT	160	25MAR94	9NOV94
5055	REGULATORY SUPPORT	63	25MAR94	23JUN94
5060	TECHNOLOGY LITERATURE RESEARCH	46	31JAN94	5APR94
5070	OPTIONS ANALYSIS	42	4OCT94	2DEC94
5080	PREPARE IM/IRA DRAFT DD	42	5JAN95	3MAR95
5090	DOE REVIEW DRAFT IM/IRA DECISION DOC	21	6MAR95	3APR95
5095	REVISE DRAFT IM/IRA DECISION DOCUMEN	21	4APR95	3MAY95
5100	SUBMIT IM/IRA DD	0	4MAY95	3MAY95
5110	CDH/EPA REVIEW DRAFT IM/IRA DECISION	21	4MAY95	2JUN95
5120	REVISE IM/IRA DECISION DOCUMENT	21	5JUN95	3JUL95
5125	SUBMIT FINAL IM/IRA DECISION DOCUMEN	0	5JUL95	3JUL95
5130	IM/IRA PUBLIC RESPONSIVENESS SUMMARY	60	12JUL95	4OCT95
5135	SUBMIT IM/IRA RESPONSIVENESS SUMMARY	0	5OCT95	4OCT95
5140	IM/IRA DO COMMENT RESOLUTION/REVISIO	42	5OCT95	5DEC95
5150	IM/IRA DO FINAL EPA/CDH/DOE REVIEW	42	6DEC95	9FEB96
5160	SUBMIT FINAL IM/IRA DD AND RESPONSIV	0	12FEB96	9FEB96
6000	REMEDIAL DESIGN	397	4MAY95	3DEC96
6010	IM/IRA DESIGN WORK PLAN	42	4MAY95	3JUL95
6015	SUBMIT IM DESIGN WORKPLAN TO DOE	0	5JUL95	3JUL95
6020	DOE RFO/HQ REVIEW IM/IRA DESIGN WP	15	5JUL95	25JUL95
6023	REVISE IM WORKPLAN	10	26JUL95	8AUG95
6027	SUBMIT IM DESIGN WORKPLAN TO CDH/EPA	0	9AUG95	8AUG95
6030	CDH/EPA REVIEW IM/IRA DESIGN WP	15	9AUG95	29AUG95
6035	REVISE IM WORKPLAN PER EPA/CDH COMME	5	30AUG95	6SEP95
6040	IM DESIGN WORKPLAN COMPLETE	0	7SEP95	6SEP95
6050	PHASE I IM/IRA IMPL. DOC (DRAFT TITL	100	7SEP95	5FEB96
6055	SUBMIT PHASE I IM/IRA IMPL. DOCUMENT	0	6FEB96	5FEB96
6060	DOE RFO/HQ REVIEW IM/IRA IMPLEMENTAT	21	6FEB96	5MAR96
6065	REVISE IM/IRA IMPL. DOCUMENT PER DOE	21	6MAR96	4APR96
6070	SUBMIT DRAFT PHASE I IM/IRA IMPL. DO	0	5APR96	4APR96
6080	CDH/EPA REVIEW DRAFT IM/IRA IMPL. DO	42	5APR96	4JUN96
6082	REVISE IM/IRA IMPLEMENTATION DOCUMEN	63	5JUN96	3SEP96
6084	SUBMIT TITLE II DESIGN TO CDH/EPA	0	4SEP96	3SEP96
6086	CDH/EPA REVIEW TITLE II DESIGN	42	4SEP96	31OCT96
6090	FINAL TITLE II DESIGN WITH CONSTRUCT	21	1NOV96	3DEC96
10000	PRESENT LANDFILL CLOSURE CONSTRUCTIO	250	6MAR96	6MAR97



Plot Date 14APR94
Data Date 25JAN94
Project Start 25JAN94
Project Finish 23JUN98

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

0070

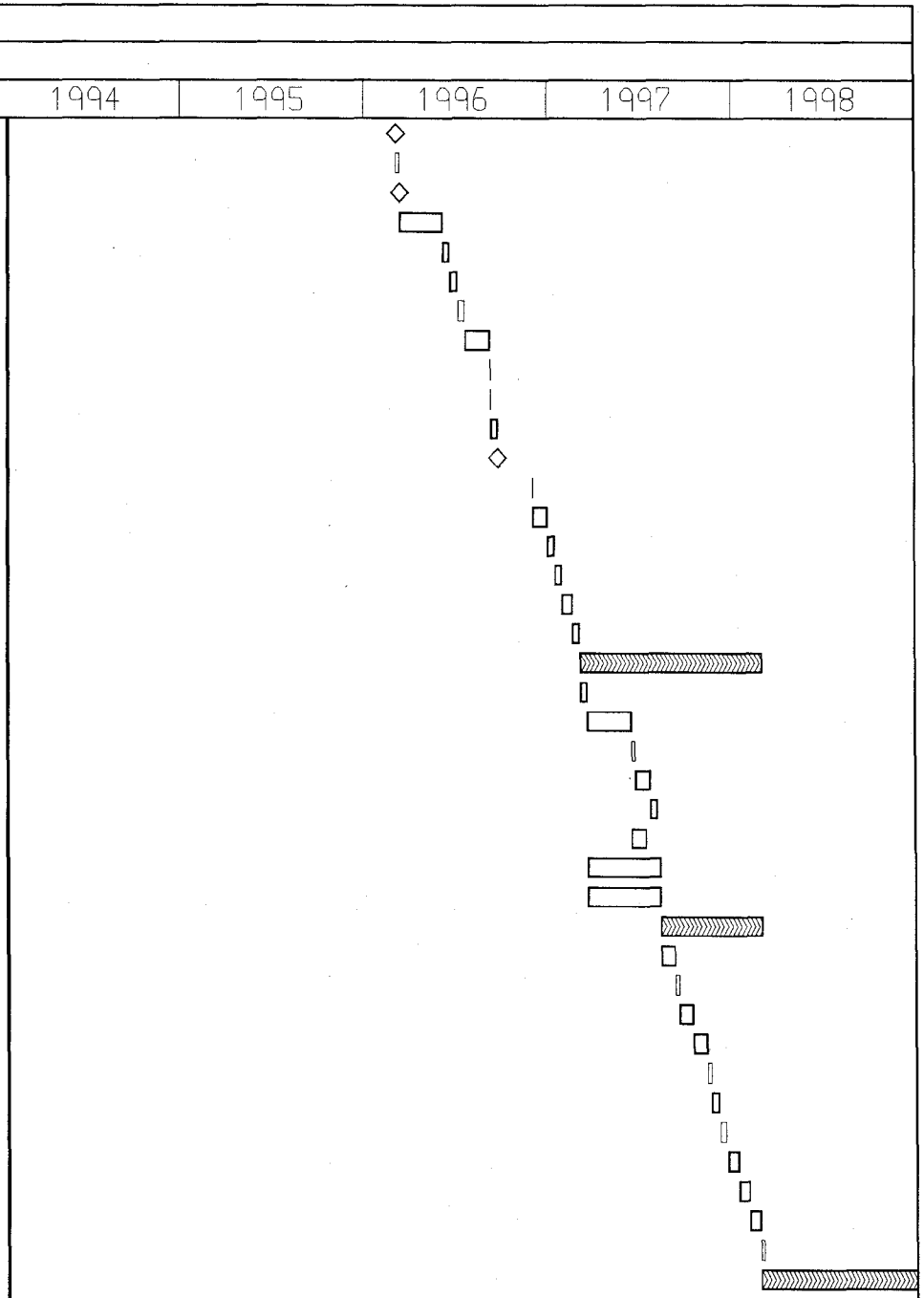
Sheet 2 of 4

Hanwock
Hanwock

EG&G ROCKY FLATS
OU 7 PRESENT LANDFILL
FIGURE 1 OUTYEAR SCHEDULE

Date	Revision	Checked	Approved

ACTIVITY ID	ACTIVITY DESCRIPTION	ORIG DUR	EARLY START	EARLY FINISH
10010	BEGIN IM/IRA CONSTRUCTION PROCESS	0	6MAR96	5MAR96
10020	DAVIS BACON DETERMINATION	5	6MAR96	12MAR96
10030	DAVIS BACON APPROVAL	0	13MAR96	12MAR96
10040	CONTRACT DEFINITION/ADVANCE NOTICE	60	13MAR96	6JUN96
10050	SUBCONTRACT BOILER PLATE (PROCUREMEN	10	7JUN96	20JUN96
10060	SUBCONTRACT DIVISION	10	21JUN96	5JUL96
10070	IWCP DRAFT (FS DRAFT TITLE II DESIGN	10	8JUL96	19JUL96
10080	ISSUE RFP	35	22JUL96	9SEP96
10090	PRE-BID TOUR	1	10SEP96	10SEP96
10100	BID PROPOSAL RECEIVED	1	11SEP96	11SEP96
10110	BID PROPOSAL TECHNICAL REVIEW	10	12SEP96	25SEP96
10120	SUBCONTRACT AWARD	0	26SEP96	25SEP96
10130	NOTICE TO PROCEED	1	4DEC96	4DEC96
10140	RECEIVE SUBMITTALS	15	5DEC96	2JAN97
10150	APPROVE SUBMITTALS	10	3JAN97	16JAN97
10160	FINALIZE IWCP	10	17JAN97	30JAN97
10170	SUBCONTRACTOR TRAINING	15	31JAN97	20FEB97
10180	SUBCONTRACTOR MOBILIZATION	10	21FEB97	6MAR97
70000	CONSTRUCTION	245	7MAR97	2MAR98
70050	REPAIR ELP SLUMP	10	7MAR97	20MAR97
70100	CONSTRUCT SLURRY WALL	60	21MAR97	16JUN97
70200	DEWATER POND	5	17JUN97	23JUN97
70300	DEWATER SEDIMENTS	21	24JUN97	23JUL97
70400	SEDIMENT REMOVAL	10	24JUL97	6AUG97
70500	SOIL REMOVAL (HOT SPOTS)	21	17JUN97	16JUL97
70700	LEACHATE COLLECTION TREATMENT SYSTEM	100	21MAR97	12AUG97
70800	GROUNDWATER COLLECTION AND TREATMENT	100	21MAR97	12AUG97
70900	MULTILAYER CAP	135	13AUG97	2MAR98
71000	ABANDON EXISTING WELLS	20	13AUG97	10SEP97
71100	COMPACTION OF WASTE	5	11SEP97	17SEP97
71200	INSTALL FOUNDATION LAYER	20	18SEP97	15OCT97
71300	INSTALL GAS VENT LAYER	20	16OCT97	12NOV97
71400	INSTALL GEOGRID	5	13NOV97	19NOV97
71500	INSTALL GEOSYNTHETIC CLAY LINER	10	20NOV97	5DEC97
71600	INSTALL FLEXIBLE MEMBRANE LINER	10	8DEC97	19DEC97
71700	INSTALL DRAINAGE LAYER	10	22DEC97	12JAN98
71800	INSTALL SOIL COVER	15	13JAN98	2FEB98
71900	REVEGETATION	15	3FEB98	23FEB98
72000	FENCING	5	24FEB98	2MAR98
80000	OPERATIONS AND MAINTENANCE	7462	24FEB98	25FEB28



Plot Date 14APR94
Data Date 25JAN94
Project Start 25JAN94
Project Finish 29JUN28

(c) Primavera Systems, Inc.

Activity Bars/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

OUTD

Sheet 3 of 4

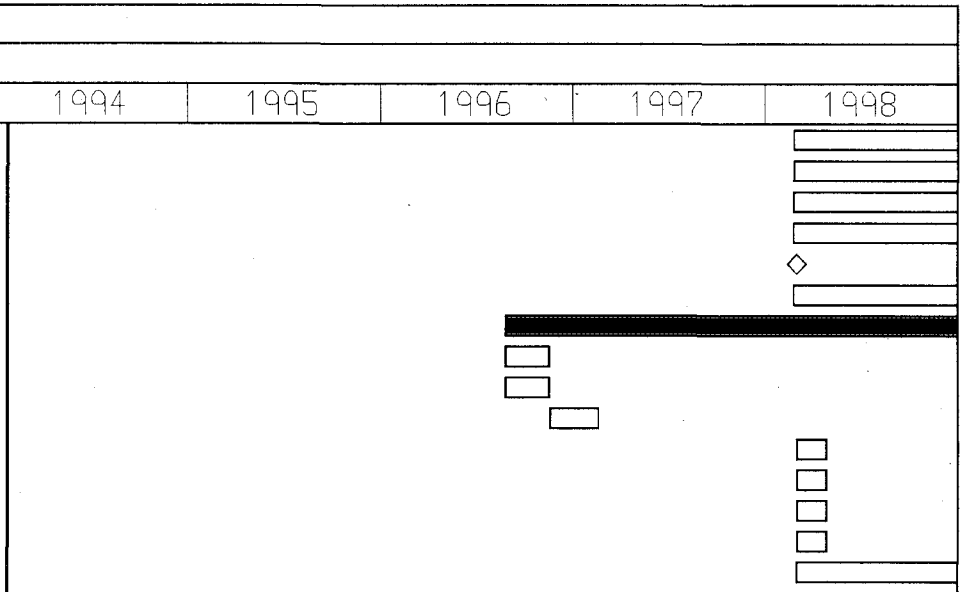
Hannock
Hannock

EG&G ROCKY FLATS
OU 7 PRESENT LANDFILL
FIGURE 1 OUTYEAR SCHEDULE

Date	Revision	Checked	Approved

48

ACTIVITY ID	ACTIVITY DESCRIPTION	ORIG DUR	EARLY START	EARLY FINISH
80100	GROUNDWATER COLLECTION AND TREATMENT	2490	24FEB98	25FEB08
80200	GAS COLLECTION SYSTEM	7462	24FEB98	25FEB28
80300	LEACHATE COLLECTION OPERATIONS	2490	24FEB98	25FEB08
80400	MULTILAYER CAP MAINTENANCE	7462	24FEB98	25FEB28
80500	POST-CLOSURE CARE BEGINS	0	3MAR98	2MAR98
90000	POST-CLOSURE MONITORING	7463	24FEB98	28FEB28
100000	REPORTING	7915	26AUG96	23JUN28
100100	CLOSURE PLAN	60	26AUG96	18NOV96
100200	POST-CLOSURE PLAN	60	26AUG96	18NOV96
100300	CLOSURE PLAN APPROVAL	60	19NOV96	20FEB97
100400	CLOSURE CERTIFICATION	40	3MAR98	28APR98
100500	SURVEY PLAT	40	3MAR98	28APR98
100600	RECORD OF WASTES	40	3MAR98	28APR98
100700	DEED NOTATION	40	3MAR98	28APR98
100800	ANNUAL POST-CLOSURE MONITORING REPOR	7460	3MAR98	1MAR28
100900	PUBLIC HEALTH EVALUATION	6216	3MAR03	1MAR28
110000	POST-CLOSURE ACTIVITIES COMPLETED	0	2MAR28	1MAR28
110100	POST-CLOSURE CERTIFICATION	40	2MAR28	27APR28
110200	RELEASE FROM FINANCIAL ASSURANCE	40	28APR28	23JUN28



Plot Date 14APR94
Data Date 25JAN94
Project Start 25JAN94
Project Finish 23JUN28

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

0070

Sheet 4 of 4

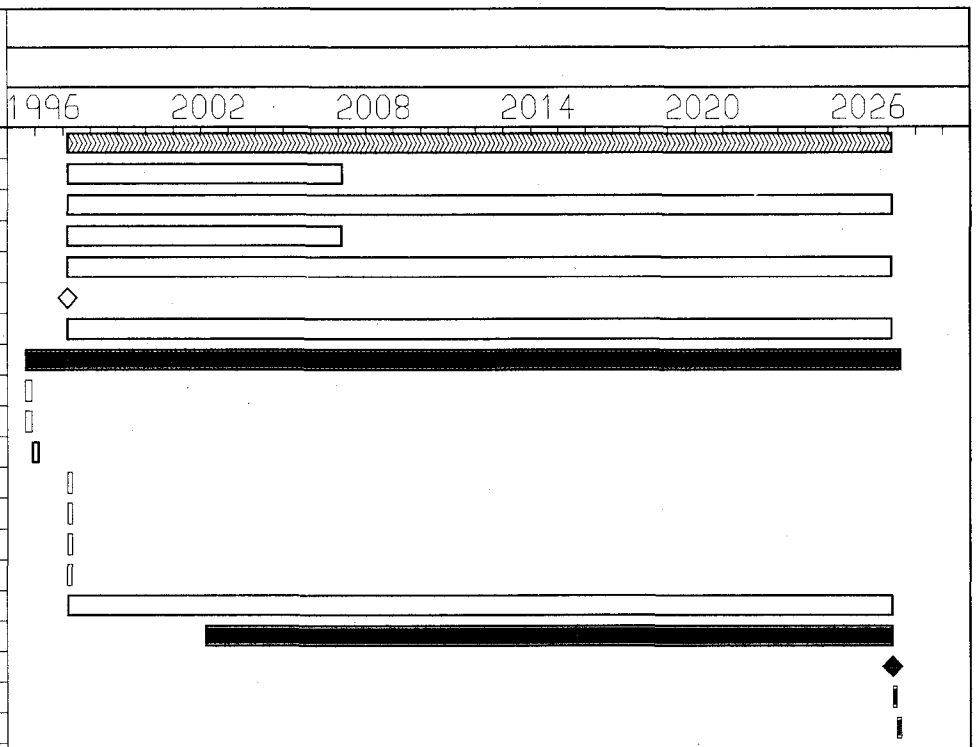
Hamock
Hamock

EG&G ROCKY FLATS
OU 7 PRESENT LANDFILL
FIGURE 1 OUTYEAR SCHEDULE

Date	Revision	Checked	Approved

49

ACTIVITY ID	ACTIVITY DESCRIPTION	ORIG DUR	EARLY START	EARLY FINISH
80000	OPERATIONS AND MAINTENANCE	7462	24FEB98	25FEB28
80100	GROUNDWATER COLLECTION AND TREATMENT	2490	24FEB98	25FEB08
80200	GAS COLLECTION SYSTEM	7462	24FEB98	25FEB28
80300	LEACHATE COLLECTION OPERATIONS	2490	24FEB98	25FEB08
80400	MULTILAYER CAP MAINTENANCE	7462	24FEB98	25FEB28
80500	POST-CLOSURE CARE BEGINS	0	3MAR98	2MAR98
90000	POST-CLOSURE MONITORING	7463	24FEB98	28FEB28
100000	REPORTING	7915	26AUG96	23JUN28
100100	CLOSURE PLAN	60	26AUG96	18NOV96
100200	POST-CLOSURE PLAN	60	26AUG96	18NOV96
100300	CLOSURE PLAN APPROVAL	60	19NOV96	20FEB97
100400	CLOSURE CERTIFICATION	40	3MAR98	28APR98
100500	SURVEY PLAT	40	3MAR98	28APR98
100600	RECORD OF WASTES	40	3MAR98	28APR98
100700	DEED NOTATION	40	3MAR98	28APR98
100800	ANNUAL POST-CLOSURE MONITORING REPOR	7460	3MAR98	1MAR28
100900	PUBLIC HEALTH EVALUATION	6216	3MAR03	1MAR28
110000	POST-CLOSURE ACTIVITIES COMPLETED	0	2MAR28	1MAR28
110100	POST-CLOSURE CERTIFICATION	40	2MAR28	27APR28
110200	RELEASE FROM FINANCIAL ASSURANCE	40	28APR28	23JUN28



Plot Date 14APR94
Data Date 25JAN94
Project Start 25JAN94
Project Finish 23JUN28

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

OU7D

Sheet 1 of 1

Hancock
DSR Hancock

EG&G ROCKY FLATS
OU 7 PRESENT LANDFILL
FIGURE 1 OUTYEAR SCHEDULE

Date	Revision	Checked	Approved

5/0/50